



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/606,943

06/26/2003

Gersh Z. Taicher

EMS-03-01

4466

34010

7590

01/05/2007

RICHARD A. FAGIN

P.O. BOX 1247

RICHMOND, TX 77406-1247

EXAMINER

KISH, JAMES M

ART UNIT

PAPER NUMBER

3737

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
--	-----------	---------------

3 MONTHS

01/05/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/606,943

Applicant(s)

TAICHER ET AL.

Examiner

James Kish

Art Unit

3737

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 1-43 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1 and 6-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Yperen (US Patent No. 5,402,787) in view of Patrick et al. (US Patent No. 4,720,679). Van Yperen discloses a MRI method comprising multiple refocusing RF-pulses and receiving spin-echoes following an excitation RF-pulse (see Abstract). The method utilizes a Carr-Purcell-Meiboom-Gill sequence (CPMG-sequence) (column 1, lines 1-25). Also see column 2, line 58 through column 3, line 3. The CPMG-sequence provides information about the density of a certain type of nuclei and the substance in which they occur, thereby allowing an operator to determine the composition (column 4, lines 29-36). Figure 2 shows a known sequence of RF-pulses and gradients for obtaining the NMR-signals. A written description of Figure 2 can be found at column 4, lines 42-66. However, Van Yperen does not disclose a method for whole body imaging.

Art Unit: 3737

Patrick teaches whole body water-lipid separation by correcting for magnetic field and other problems, which heretofore prohibited water/lipid separation over a large area using a CPMG technique (column 6, line 66 through column 7, line 27). A 180° inversion pulse selectively inverts or reverses the direction of precession (column 8, lines 48-49). It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the whole body imaging as taught by Patrick in the system and method of Van Yperen to allow possible tissue characterization and the like (column 7, lines 3-6).

With respect to claims 10-11, Van Yperen and Patrick disclose MRI methods comprising multiple refocusing RF-pulses and receiving spin-echoes following an excitation RF-pulse. It is obvious to one having ordinary skill in the art when using an MRI system that an operator can perform T_1 and/or T_2 based imaging, as well as provide gradient pulses with varying amplitudes to acquire slice selective images.

2. Claims 12, 17-23, 27-29, 33, 37-39 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Yperen (US Patent No. 5,402,787) in view of Patrick et al. (US Patent No. 4,720,679), further in view of Ddale et al. (US Patent No. 7,078,899). Van Yperen and Patrick disclose MRI methods comprising multiple refocusing RF-pulses and receiving spin-echoes following an excitation RF-pulse (see Abstract). However, Van Yperen does not discuss using an objective function for field determination. Dale teaches a magnetic resonance data acquisition method including designating a plurality of parameters for acquiring specific conditions. These

Art Unit: 3737

parameters comprise engineering costs, quantitative imaging precision, and other objective image-quality measures and process-quality measures (column 2, lines 50-67). It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the parameter determination methods of Dale in the system of Van Yperen and Patrick in order to select optimal MR sequences (column 2, lines 10-31).

With respect to claims 21-22, 27-29, 37-39 and 43 Van Yperen and Patrick disclose MRI methods comprising multiple refocusing RF-pulses and receiving spin-echoes following an excitation RF-pulse. It is obvious to one having ordinary skill in the art when using an MRI system that an operator can perform T_1 and/or T_2 based imaging, as well as provide gradient pulses with varying amplitudes to acquire slice selective images.

3. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Van Yperen in view of Patrick et al., further in view of Tomlinson et al. (US Patent No. 4,034,191). Van Yperen and Patrick disclose MRI methods comprising multiple refocusing RF-pulses and receiving spin-echoes following an excitation RF-pulse (see Abstract). However, Van Yperen does not discuss having RF magnetic fields with uniform spectral density. Tomlinson teaches an RF excitation of generally uniform spectral density over a relatively wide bandwidth as of 1000 Hz on one side of a carrier frequency, as of 60 to 100 MHz, except for a relatively narrow portion of the spectrum over which excitation of resonance is undesired (column 4, lines 13-18). It would have

Art Unit: 3737

been obvious to one having ordinary skill in the art at the time the invention was made to use a uniform spectral density as taught by Tomlinson to keep the magnetic field homogenous throughout.

4. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Van Yperen in view of Patrick et al., further in view of Dale et al., in even further view of Tomlinson et al. (US Patent No. 4,034,191). Van Yperen and Patrick disclose MRI methods comprising multiple refocusing RF-pulses and receiving spin-echoes following an excitation RF-pulse (see Abstract). However, Van Yperen does not discuss having RF magnetic fields with uniform spectral density. Tomlinson teaches an RF excitation of generally uniform spectral density over a relatively wide bandwidth as of 1000 Hz on one side of a carrier frequency, as of 60 to 100 MHz, except for a relatively narrow portion of the spectrum over which excitation of resonance is undesired (column 4, lines 13-18). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a uniform spectral density as taught by Tomlinson to keep the magnetic field homogenous throughout.

5. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Yperen in view of Patrick et al., further in view of Bottomley (US Patent No. 4,585,993). Van Yperen and Patrick disclose MRI methods comprising multiple refocusing RF-pulses and receiving spin-echoes following an excitation RF-pulse (see Abstract). However, Van Yperen does not discuss using either composite or spectrally shaped RF

Art Unit: 3737

pulses. Bottomley teaches the use of spectrally shaped RF pulses in NMR to limit the frequency spectrum of the RF carrier pulse to a narrow band of frequencies about the NMR frequency of the nuclei to be saturated. Bottomley also teaches that composite pulses may be employed for simultaneously saturating, or inverting, all but the selected nuclei (column 3, lines 45-64). Therefore, it would be obvious to one having ordinary skill in the art at the time the invention was made to use either type of RF pulse in order to select a specific type of nuclei within the body.

6. Claims 15-16, 31-32 and 41-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Yperen in view of Patrick et al., further in view of Dale et al., in even further view of Bottomley (US Patent No. 4,585,993). Van Yperen and Patrick disclose MRI methods comprising multiple refocusing RF-pulses and receiving spin-echoes following an excitation RF-pulse (see Abstract). However, Van Yperen does not discuss using either composite or spectrally shaped RF pulses. Bottomley teaches the use of spectrally shaped RF pulses in NMR to limit the frequency spectrum of the RF carrier pulse to a narrow band of frequencies about the NMR frequency of the nuclei to be saturated. Bottomley also teaches that composite pulses may be employed for simultaneously saturating, or inverting, all but the selected nuclei (column 3, lines 45-64). Therefore, it would be obvious to one having ordinary skill in the art at the time the invention was made to use either type of RF pulse in order to select a specific type of nuclei within the body.

Art Unit: 3737

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Van Yperen in view of Patrick et al., further in view of Kimmlingen et al. (US Patent No. 6,717,409). Van Yperen and Patrick disclose MRI methods comprising multiple refocusing RF-pulses and receiving spin-echoes following an excitation RF-pulse (see Abstract). However, Van Yperen does not discuss the use of booster coils. Kimmlingen teaches a MR tomography apparatus with at least one booster coil for creating the desired homogeneity within the imaging volume. It would have been obvious to one having ordinary skill in the art at the time the invention was made to include booster coils within the system as taught by Kimmlingen in order to produce a desired homogeneity volume with enhanced performance characteristics (column 4, lines 46-51).

8. Claims 13, 24-26, 30, 34-36 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Yperen in view of Patrick et al., further in view of Dale et al., in even further view of Kimmlingen et al. (US Patent No. 6,717,409). Van Yperen and Patrick disclose MRI methods comprising multiple refocusing RF-pulses and receiving spin-echoes following an excitation RF-pulse (see Abstract). However, Van Yperen does not discuss the use of booster coils. Kimmlingen teaches a MR tomography apparatus with at least one booster coil for creating the desired homogeneity within the imaging volume. It would have been obvious to one having ordinary skill in the art at the time the invention was made to include booster coils within the system as taught by

Art Unit: 3737

Kimmlingen in order to produce a desired homogeneity volume with enhanced performance characteristics (column 4, lines 46-51).


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Kish whose telephone number is 571-272-5554. The examiner can normally be reached on 8:30 - 5:00 ~ Mon. - Fri..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Casler can be reached on 571-272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JMK


ELENI MANTIS MERCADER
SUPERVISORY PATENT EXAMINER